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April 23, 1974

Dr. E. E. Grishayev
Head, Department of Finance and Capital Investment
State Committee of the Council of Ministers
Moscow, U.S.S.R.

Dear Dr. Grishayev:

In accordance with our agreement reached at the November, 1973, meeting of the US-USSR Joint Group of Experts in the Field of Science Policy, I am enclosing for your consideration material called for in the Study Outline established for the exchange of information on the financing of research and development.

The material is organized into two sections. The first contains table shells showing the types of USSR research and development data requested by US analysts of Soviet research and development activities. The second contains table shells representing the types of research and development financial data which can be made available to Soviet experts on research and development activities in the US and related material on US collection methodologies, definitions and concepts.

Generally, the research and development expenditure data called for in both sections pertain to:

type of work (fundamental and applied research, development, construction of research and development plant)

type of research and development performer

field of science

function (such as health, transportation, etc.)

Science Policy

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

branches of the national economy (industry, agriculture, etc.)

cost elements (wages, materials)

size of performing institution

geographic location

sources of financing (budget, enterprise funds) and mode of financing contracts, direct funding.

The terminology used to describe the characteristics of Soviet research and development financial data reflect US perceptions of the appropriate terms based on available Soviet literature. Our perceptions may be faulty, and it is possible that better terms can be arrived at in further discussions.

Section I contains 24 table shells for which Soviet data are requested. The first 21 of these tables refer to science outlays (on research and development and/or construction) as defined in Soviet statistical practice. Since Soviet accounting differs somewhat from ours, and since an ultimate goal of our joint effort is to develop more comparable measures of US and USSR research and development activity, we have included three additional tables (Tables 22-24) which deal with expenditures not included in Soviet data on science outlays but are included to a considerable extent in US data on research and development in industrial enterprises.

Throughout Tables 1-21, terminology is intended to be uniform. Thus, in Table 1 "research and development" means science outlays excluding construction, and this is the meaning in which research and development is used throughout the first 16 table shells. Similarly, in Table 1, "construction" means capital investment for science only, and this is its meaning in Tables 4 and 18-20. Where a term has a more restricted meaning in one table than in another, this is specified: for example, in the tables that involve distributions of outlays by type of performer, "production enterprises" conceptually includes enterprises in all branches of material production; in Tables 17 and 22-24, it seemed appropriate to restrict the term to industrial enterprises only.

Please note that Table 21 asks for a distribution of research and development outlays by function or purpose but that no functional categories are provided. This omission arises from the difficulty in framing such a table in terms that do not simply duplicate either the functional categories used by the US side, which may not be suitable for classifying Soviet research and development data, or terms used in the distribution asked for by branch of the economy and branch of industry. We will welcome indications of possible functional categories

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

for which the USSR side could provide data. The extent to which the distributions by branch of the economy and branch of industry approximate functional groupings depends of course on how the data are derived. We anticipate that many questions of this sort will arise throughout the study which will be clarified by providing explanatory notes with tabular material and by exchange of information on statistical concepts, definitions and methodology of collecting and aggregating data, as provided for in the Study Outline.

The years specified on the tables represent our notion of what data are most likely to be available in finished form in Soviet statistics. If, however, the Soviet side is able to provide data for nonspecified years, such data would be welcome.

Section II contains 38 table shells indicating the data the US side can make available to Soviet analysts on US financing of research and development. The tables provide for data aggregated to the national level as well as selected statistics for each of the four major sectors of the economy. We have included in Section II information on the definitions, concepts and survey methodology (including survey forms and instructions) used in collecting US data on research and development.

I look forward to receiving from you in the near future a list of the types of data Soviet analysts would be interested in receiving from the US side and the types of data on research and development financing available from the Soviet side.

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Enclosures

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Contents

Section I. U.S.S.R. Data on Financing Research and Development

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

U.S. - U.S.S.R. PROGRAM OF COOPERATION IN THE FIELD OF SCIENCE POLICY

Proposed R&D Expenditure Data to be Included in the Exchange of Information Between the U.S. and U.S.S.R.

Prepared by the U.S. Members of the Working Subgroup on the Financing of Research and Development

April 1974

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Page No.

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 1
USSR: Total Science Outlays (R&D and Construction), 1950-1973

[Million rubles]

Year	Total	R&D	Construction
1950			
1951			
1952			
1953			
1954			
1955			
1956			
1957			
1958			
1959			
1960			
1961			
1962			
1963			
1964			
1965			
1966			
1967			
1968			
1969			
1970			
1971			
1972			
1973			

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 2
USSR: Total R&D Outlays by Type of Work, by selected Years, 1950-1973

[Million rubles]

Year	Total	Fundamental research	Applied research	Development
1950				
1966				
1967				
1968				
1969				
1970				
1971				
1972				
1973				

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 3

USSR: Total R&D Outlays by Type of Performer, 1950-1973

[Million rubles]

Year	Total	R&D Organizations		Higher Educational Institutions	Production Enterprises	Other Organizations
		Total	Of which: Academies			
1950						
1951						
1952						
1953						
1954						
1955						
1956						
1957						
1958						
1959						
1960						
1961						
1962						
1963						
1964						
1965						
1966						
1967						
1968						
1969						
1970						
1971						
1972						
1973						

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 4
USSR: Total Construction Outlays by Type of Performer, 1950-1973

[Million rubles]

Year	Total	R&D Organizations		Higher Educational Institutions	Production Enterprises	Other Organizations
		Total	Of which: Academies			
1950						
1951						
1952						
1953						
1954						
1955						
1956						
1957						
1958						
1959						
1960						
1961						
1962						
1963						
1964						
1965						
1966						
1967						
1968						
1969						
1970						
1971						
1972						
1973	.....	.....	.....	.....	.....	.....

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 5
USSR: Total R&D Outlays by Sources of Funding, 1950-1973

[Million rubles]

Year	Total	Direct Funding				Contracts			
		Total	Science budget	Other budget	Enterprise funds	Total	Science budget	Other budget	Enterprise funds
1950									
1951									
1952									
1953									
1954									
1955									
1956									
1957									
1958									
1959									
1960									
1961									
1962									
1963									
1964									
1965									
1966									
1967									
1968									
1969									
1970									
1971									
1972									
1973									

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 6
USSR: Total R&D Outlays by Branch of the Economy, 1950-1973

[Million rubles]

Branch of Economy	1950	1951	1952	---------- 1973
Total all Branches				
Industry				
Agriculture				
Forestry				
Transportation				
Communications				
Construction				
Trade, supply, procurement				
Housing and Municipal services				
Health				
Education, culture, art				
Geology				
Hydrometeorology				
Administration and finance				
Other functional branches				
Other outlays not attributable to functional branches[a]				

[a] For example, outlays of the general academies of sciences, higher educational institutions.

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 7

USSR: Total R&D Outlays by Branch of the Economy and Type of Performer, 1965-1973[a/]

[Million rubles]

Branch of Economy	Total	R&D Organizations		Higher Educational Institutions	Production Enterprises	Other Organizations
		Total	Of which: Academies			
Total all Branches						
Industry						
Agriculture						
Forestry						
Transportation						
Communications						
Construction						
Trade, supply, procurement						
Housing and municipal services						
Health						
Education, culture, art						
Geology						
Hydrometeorology						
Administration and finance						
Other outlays not attributable to functional branches						

a/ These data are requested for each year, 1965 through 1973.

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 8

USSR: Total R&D Outlays by Branch of the Economy and Source of Funding, 1965-1973[a/]

[Million rubles]

Branch of Economy	Total	Direct Funding				Contracts			
		Total	Science budget	Other budget	Ent. funds	Total	Science budget	Other budget	Ent. funds
Total all Branches									
Industry									
Agriculture									
Forestry									
Transportation									
Communications									
Construction									
Trade, supply, procurement									
Housing and municipal services									
Health									
Education, culture, art									
Geology									
Hydrometeorology									
Administration and finance									
Other functional branches									
Other outlays not attributable to functional branches									

a/ These data are requested for each year, 1965 through 1973

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 9
USSR: Total Industrial R&D Outlays By Branch of Industry, 1950-1973

[Million rubles]

Branch of Industry	1950	1951	1952	---------- 1973
Total all Branches				
Electric power				
Fuels				
Oil and gas				
Coal				
Other fuels				
Ferrous metals				
Nonferrous metals				
Chemicals and petrochemicals				
Chemicals				
Petrochemicals				
Machinebuilding and metalworking				
Heavy, power, and transport machinery				
Electrical equipment				
Etc.				
Lumber, wood products, paper				
Construction materials				
Glass, porcelain				
Light industry				
Food industry				
Other industry				

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 10

USSR: Total Industrial R&D Outlays by Branch of Industry and Type of Performer, 1965-1973[a/]

[Million rubles]

Branch of Industry	Total	R&D Organizations		Higher Educational Institutions	Production Enterprises	Other Organizations
		Total	Of which: academies			
Total all Branches						
Electric power						
Fuels						
Oil and gas						
Coal						
Other fuels						
Ferrous metals						
Nonferrous metals						
Chemicals and Petrochemicals						
Chemicals						
Petrochemicals						
Machinebuilding and metal working						
Heavy, power, and transport mach.						
Electrical equipment etc.						
Lumber, wood products, paper						
Construction materials						
Glass, porcelain						
Light industry						
Food industry						
Other industry						

[a/] These data are requested for each year, 1965 through 1973.

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 11

USSR: Total Industrial R&D Outlays by Branch of Industry and Source of Funding, 1965-73[a/]

[Million rubles]

Branch of Industry	Total	Direct funding				Contracts			
		Total	Science budget	Other budget	Ent. funds	Total	Science budget	Other budget	Ent. fun
Total all Branches									
Electric power									
Fuels									
Oil and gas									
Coal									
Other fuels									
Ferrous metals									
Nonferrous metals									
Chemicals and petrochemicals									
Chemicals									
Petrochemicals									
Machinebuilding and metal-working									
Heavy, power, transp. mach.									
Electrical equipment etc.									
Lumber, wood products, paper									
Construction materials									
Glass, porcelain									
Light industry									
Food industry									
Other industry									

a/ These data are requested for each year, 1965 through 1973

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 12

USSR: Total R&D Outlays by Type of Performer, Type of Work, and Source of Funding, 1965-1973[a/]

[Million rubles]

Performer & Type of Work	Total	Direct funding				Contracts			
		Total	Science budget	Other budget	Ent. funds	Total	Science budget	Other budget	Ent. funds
Total all Performers									
R&D Organizations, Total									
Fundamental research									
Applied research									
Development									
Of which: Academies									
Fundamental									
Applied									
Development									
Higher Educational Institutions									
Fundamental									
Applied									
Development									
Production Enterprises									
Fundamental									
Applied									
Development									
Other Organizations									
Fundamental									
Applied									
Development									

a/ These data are requested for each year, 1965 through 1973.

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 13
USSR: R&D Outlays by Type of Expenditure (R&D Organizations Only), Selected Years, 1950-1973

[Million rubles]

Type of Expenditure	1950	1960	1965	---------- 1973
Total all Expenditure				
Wages				
Scientists and engineers				
Other employees				
Purchase of Equipment				
Scientific equipment				
Other equipment				
Materials, Power, etc.				
Materials				
Power				
Other				
Other Expenditures				
Social insurance charges				
Stipends				
Capital repair				
Other				

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 14
USSR: Fundamental and Applied Research Outlays by Field of Science, Selected Years, 1950-1973a/

[Million rubles]

Field of Science	1950	1960	1965	1973
Total, all Fields				
Physics and mathematics				
Physics				
Mathematics				
Chemistry				
Biology				
Geology and mineralogy				
Technical sciences				
Machinebuilding				
etc.				
Agricultural and veterinary sciences				
History				
Economics				
Philosophy				
Sociology				
Other				
Philology				
Linguistics				
Other				
Geography				
Oceanography				
Meteorology				
Other				
Law				
Pedagogical sciences				
Psychology				
Medicine and pharmacy				
Art				
Architecture				
Other Sciences				

a/ For years in which the distinction can be made, separate tables are desirable (one for fundamental and one for applied research).

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 15
USSR: Total R&D Outlays by Geographic Region, Selected Years, 1950-1973
[Million rubles]

Geographic Region	1950	1960	1965	---------- 1973
Total, all Regions				
RSFSR				
(If possible, please subdivide by region)				
Ukrainian SSR				
Belorussian SSR				
Lithuanian SSR				
Latvian SSR				
Estonian SSR				
Moldavian SSR				
Georgian SSR				
Azerbaidzhan SSR				
Armenian SSR				
Uzbek SSR				
Kazakh SSR				
Kirgiz SSR				
Tadzhik SSR				
Turkmen SSR				

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 16
USSR: R&D Outlays of R&D Organizations by Size of Organization, 1965-1973

[Million rubles]

Size of organization	1965	1966	---------- 1973
Total, all R&D Organizations			
By Size Classes Based on Employment (units) For example: 500 or less 501 - 1,000 1,001 - 3,000 3,000 or more			
By Size Classes Based on Outlays (1,000 rubles) For example: 1,500 or less 1,501 - 3,000 3,000 -10,000 10,000 or more			

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 17
USSR: R&D Outlays of Production Enterprises (Industrial Enterprises Only)
By Size of Enterprise, 1965-1973

[Million rubles]

Size of Enterprise	1965	1966	---------- 1973
Total, all Industrial Enterprises			
By Size Classes Based on Employment (units) For example: 1,000 or less 1,001 - 3,000 3,001 -10,000 10,001 or more			
By Size Classes Based on Gross Output (1,000 rubles) For example: 10,000 or less 10,001 - 50,000 50,001 -100,000 100,001 or more			

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 18
USSR: Total Construction Outlays by Sources of Funding, Selected Years, 1950-1973
[Million rubles]

Year	Total	Science budget	Other Budget	Enterprise funds
1950				
1951				
1952				
1953				
1954				
1955				
1956				
1957				
1958				
1959				
1960				
1961				
1962				
1963				
1964				
1965				
1966				
1967				
1968				
1969				
1970				
1971				
1972				
1973				

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 19
USSR: Total Construction Outlays by Type of Expenditure, Selected Years, 1950-1973

[Million rubles]

Year	Total	Construction and installation	Equipment	Other expenditures
1950				
1951				
1952				
1953				
1954				
1955				
1956				
1957				
1958				
1959				
1960				
1961				
1962				
1963				
1964				
1965				
1966				
1967				
1968				
1969				
1970				
1971				
1972				
1973				

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 20
USSR: Total Construction Outlays by Branch of the Economy, Selected Years, 1950-1973

[Million rubles]

Branch of economy	1950	1955	1960	1965	1973
Total, all Branches					
Industry					
Agriculture					
Forestry					
Transportation					
Communications					
Construction					
Trade, supply, procurement					
Housing and municipal services					
Health					
Education, culture, art					
Geology					
Hydrometeorology					
Administration and finance					
Other functional branches					
Other outlays not attributable to functional branches					

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 21
USSR: Total R&D Outlays by Function, 1966-1973
[Million rubles]

Year	Total R&D Outlays	Function[a/]
1966		
1967		
1968		
1969		
1970		
1971		
1972		
1973		

[a/] The Soviet side is requested to provide suitable functional categories.

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 22
USSR: Total Preproduction or "Innovation" Outlays (Not in Science Outlays)
At Industrial Production Enterprises, Selected Years, 1950-1973

[Million rubles]

Year	Total	Development[a/]	Other preproduction outlays[b/]
1950			
1960			
1965			
1966			
1967			
1968			
1969			
1970			
1971			
1972			
1973			

a/ This column is intended to cover the sort of work that would be classified as development if performed by R&D organizations (designing, building, and testing development prototypes).

b/ Start-up costs for production (tooling up, producing trial lot, etc.).

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 23

USSR: Total Preproduction or "Innovation" Outlays (Not in Science Outlays) At Industrial Production Enterprises by Source of Funding, Selected years, 1950-1973

[Million rubles]

Source of funding	1950	1960	1965	1973
Total, all Sources				
Budget				
Fund for mastering new technology				
Fund for development of production				
Gosbank loans				
Expenditures of future periods				
Other sources				

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 24
USSR: Total Preproduction or "innovation" Outlays (Not in Science Outlays) at Industrial Production Enterprises by Branch of Industry, Selected Years, 1950-1973

[Million rubles]

Branch of industry	1950	1960	1965	1973
Total, all Branches				
Electric power				
Fuels				
Ferrous metals				
Nonferrous metals				
Chemicals and petrochemicals				
Machinebuilding and metalworking				
Lumber, wood products, paper				
Construction materials				
Glass, procelain				
Light industry				
Food industry				
Other industry				

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Section II. U.S. R&D EXPENDITURE SURVEY CONCEPTS, DEFINITIONS AND METHODOLOGY

Performing Sector. U.S. Data on R&D financing are collected and compiled for each of the four major sectors of the national economy. The Federal Sector is made up of the departments and agencies of the Federal Government. The industry sector consists of both manufacturing and non-manufacturing companies. Manufacturing companies are classified in major industry groupings and non-manufacturing companies, which include organizations such as those in selected service industries, are treated as a unit. FFRDC's administered by industrial firms are also included. The universities and colleges sector is composed of all institutions of higher education, both public and private. The universities and colleges sector is comprised of the following:

- colleges of liberal arts
- schools of arts and sciences
- professional schools, such as engineering and medical schools (including affiliated hospitals)
- associated research institutions and similar organizations which represent an integral part of a university or college
- agricultural experiment stations and associated schools of agriculture

Institutions in the nonprofit sector fall into two general groups:

1) organizations that are primarily granting in nature, namely private philanthropic foundations and voluntary health agencies and 2) public and private organizations that are involved in performing research and development including separately incorporated nonprofit research institutes, professional societies, academies of science, museums, zoological gardens, botanical gardens, arboretums, nonprofit hospitals.

Finally, within each of the private sectors are a number of Federally Funded Research and Development Centers administered by private organizations. These centers are R&D performing organizations exclusively or substantially financed by the Federal Government, that were established to meet either a particular R&D objective or to provide major facilities at universities for research and associated training purposes.

R&D Activity. Research and development consist of basic and applied research in the sciences (including medical sciences) and in engineering and activities in development , as defined below.

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Research, which is made up of basic and applied, is systematic, intensive study directed toward fuller scientific knowledge of the subject studied. Research in the natural sciences - life, physical and engineering - as well as the social and psychological sciences - is covered in the Federal, universities and other nonprofit sectors. Industry coverage is limited at present to the natural sciences.

Basic research for three of the sectors, the Federal Government, universities and colleges, and other nonprofit institutions, is defined to stress the emphasis on activity in which the primary aim of the investigator is a fuller knowledge or understanding of the subject under study. To take account of an industry's commercial goals, the definition of basic research for this sector is modified to cover original investigations for the advancement of scientific knowledge which do not have specific commercial objectives although they may be in fields of present and potential interest to the reporting company.

Applied research as defined for surveys of universities and colleges is research directed toward the practical application of knowledge. To take account of the unique characteristics of industrial organizations, the industry survey defines applied research as research directed toward the discovery of new scientific knowledge which has specific commercial objectives with respect to either products or processes. By this definition, applied research in industry differs from basic research chiefly in terms of objectives of the reporting company.

Development may be summarized as the systematic use of scientific knowledge directed toward the production of useful materials, devices, systems or methods including design and development of prototypes and processes. Development includes technical activities of a non-routine nature concerned with translating research findings or other scientific knowledge into products or processes. Development does not include routing technical services to customers.

Current operating costs for research and development refer to both direct and indirect costs of research and development including depreciation, insofar as this information is available to respondents. Included under this category are wages and salaries, materials and supplies consumed, property and other taxes, maintenance and repairs, depreciation and an appropriate share of overhead. Also included are the costs of planning and administering R&D programs.

Capital R&D expenditures are excluded from current operating costs by definition and this practice is followed in both the industry and "other nonprofit" sectors. Under the accounting practices of some Federal agencies, particularly the Department of Defense, detailed data on Federal R&D funds, which are available only in terms of obligations rather than expenditures, do not include an allowance for depreciation but do include some obligations for capital items.

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Rele[redacted] 2000/08/23 : CIA-RDP79-00798A00[redacted]0090003-1

Fields of science used to classify R&D expenditure data reported by the various sectors are divided into broad field categories, most of them consisting of a number of detailed fields. The broad fields are life sciences, psychology, physical sciences, environmental sciences, mathematics, engineering, social sciences and "other sciences not elsewhere classified." Specific taxonomies for fields of science are further described in the sections that follow on individual sector surveys. These taxonomies differ only in the level of detail provided.

National R&D Expenditures

National statistics on R&D expenditures are compiled from survey data collected independently from all four sectors of the economy - Federal Government, industry, universities and colleges and other nonprofit organizations - based on the amounts each sector reports as spent for intramural research and development and the sources of such funds. While surveys have been conducted in the Federal Government and industry sectors every year since 1953, the same frequency has not been maintained for universities and colleges and other nonprofit institutions. National data for years in which data were not available for the latter two sectors are based on survey data on the performance of total research and development from the Federal and industry sectors and on estimates for the university and other nonprofit sectors.

Federal R&D Funding

R&D funding. Data are collected from Federal agencies in terms of expenditures and obligations. Expenditures represent the amounts for checks issued and cash payments made during a given period regardless of when the funds were appropriated. Obligations represent the amounts for orders placed, contracts awarded, services received, and similar transactions during a given period, regardless of when the funds are appropriated and when future payment of money is required. For those agencies operating on a cost type budget accrued expenditures and costs are reported instead of obligations. Accrued expenditures represent all costs accrued during the reporting period e cept those subject to reimbursement from other agencies. The information on expenditures represent net cash payments for research and development and R&D plant exclusive of any receipts of the agencies for those purposes.

Obligations and expenditures for work performed in foreign countries include funds directly available to Federal agencies and special foreign currencies separately appropriated.

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Reporting Period. The reporting period for Federal R&D funding survey is the fiscal year which is the government accounting period beginning July 1 of one year and ending June 30 of the following calendar year. Thus, fiscal year 1973 began on July 1, 1972 and ended June 1973.

Funds for research and development are reported on a three-year basis comparable with data shown in the Budget of the United States Government. The data include amounts actually expended or obligated in the last completed year, amounts budgeted for the current year and amounts representing the planned budget for the next year. Data for the latter two periods are considered estimates since they do not represent completed transactions and are subject to further appropriation, apportionment or allocation decisions.

Federal Agency. An agency is an organization of the Federal Government whose principal executive officer reports to the President. The two exceptions are the Library of Congress and the Postal Service which are also included in the survey. The term "subdivision" refers to any major organizational unit of a reporting agency such as a bureau, division, office or service.

Performers. Performers are either intramural organizations accomplishing operational functions or extramural organizations or persons receiving support or providing services as a result of a contract or grant.

Intramural performers are the agencies of the Federal Government. Their work is carried on directly by their own personnel. Extramural performers are all organizations outside the Federal complex that perform with Federal funds under contract or grant. Only costs of actual extramural performers are reported. The cost of extramurally procurred "off the shelf" supplies and equipment required to support intramural research and development are reported as part of the cost of intramural performance.

In addition to data on domestic R&D activities that are reported by the other three sectors of the economy, Federal R&D funding data include foreign performers which are confined to foreign citizens, organizations or governments as well as international organizations, such as NATO, UNESCO and WHO, performing R&D abroad financed by the Federal Government. Excluded are payments to U.S. agencies, organizations or citizens performing research and development abroad for the Federal Government.

A final category of performers included in data on Federal Funds for R&D is described as all other miscellaneous performers not covered in the foregoing categories such as state and local governments, and private individuals.

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

R&D Plant. Federal R&D funding data include obligations and expenditures for R&D plant, that is, R&D facilities and fixed equipment such as reactors, wind tunnels and radio telescopes. These data include funds for the acquisition or construction of major repairs to or alterations in structures, works, equipment, facilities, or land for use in R&D activities at Federal or non-Federal installations. Excluded from the R&D plant category are expendable equipment and office furniture and equipment. Obligations for foreign R&D plant are limited to Federal funds for facilities located abroad and used in support of foreign research and development.

Industrial R&D Expenditures

Operating expenditures incurred by industrial organizations in the conduct of research and development in their own laboratories or other company owned or operated facilities include wages and salaries, materials and supplies consumed, property and other taxes, maintenance and repairs, depreciation and an appropriate share of overhead that excludes capital expenditures.

Federally financed research and development includes receipts for work done by the company on R&D contracts or subcontracts and R&D portions of procurement contracts and subcontracts.

Company financed research and development includes the cost of company-sponsored research and development performed within the company. It does not include company-financed research and development contracted to outside organizations such as research institutes, universities and colleges or other nonprofit organizations.

Geographic data on an industrial research and development expenditures include only those operations located in the 50 States and the District of Columbia.

Industries and industry groups shown separately in statistical tables are classified according to the Standard Industrial Classification (SIC) Manual as follows:

Manufacturing industries:

- Food and kindred products (20)
- Textiles and apparel (22,23)
- Lumber, wood products, and furniture (24,25)
- Paper and allied products (26)
- Chemical and allied products (28)
  - Industrial chemicals (281-82)
  - Drugs and medicines (283)
  - Other chemicals (284-89)

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Petroleum refining and extraction (29,13)[1/]
Rubber products (30)
Stone, clay, and glass products (32)
Primary metals (33)

Ferrous metals and products (331-32,3391,3399)
Nonferrous metals and products (333-36,3392)

Fabricated metal products (34)
Machinery (35)
Electrical equipment and communication (36,48)[1/]
Radio and TV receiving equipment (365)
Communication equipment and electronic components (366-67, 48)
Other electrical equipment (361-64 and 369)

Motor vehicles and other transportation equipment 8(371,7 373-75, 379)
Aircraft and missiles (372, 19)

Professional and scientific instruments (38)
Scientific and mechanical measuring instruments (381-82)

Optical, surgical, photographic, and other instruments (383-87)
Other manufacturing industries-tobacco manufacturers (21), printing and publishing (27), leather products (31), and miscellaneous manufacturing industries (39)

Nonmanufacturing industries:

agriculture, forestry, and fisheries (07-09); mining (10-12,14); contract construction (15-17); transportation and other public utilities (41-47,49); wholesale and retail trade (50-59); finance, insurance, and real estate (60-67); and selected service industries (739,807,891).

[1/] Crude petroleum extraction (13) is grouped with petroleum refining (29), and communication (48) is grouped with electrical equipment (36), in the manufacturing group of industries.

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

A reporting unit for industry R&D expenditure data is the company or corporate family which includes all establishments under common ownership or control. Similarly each company is classified in a single size category on the basis of its total employment.

The industry R&D survey sample encompasses all manufacturing industries and those non-manufacturing industries known on the basis of earlier more detailed samples to conduct or to finance research and development. The sampling unit for the survey is the company, defined as a business organization consisting of one or more establishments under common ownership or control. All manufacturing companies with 1,000 or more employees in 1967, as determined from the 1967 Economic Censuses Enterprise Statistics multi-unit file, are included in the samples with certainty. Manufacturing companies with fewer than 1,000 employees are sampled at rates depending upon their industry and employment size as determined in the 1967 Economic Censuses Enterprise Statistics multi-unit file and the 1967 Census of Manufacturing universe file. For non-manufacturing industries, the sample was based on the 1966 records of the Social Security Administration.

Approximately 8,000 manufacturing and non-manufacturing companies were represented in the 1971 sample. More than 1,800 of the companies included were "certainty" companies which account for almost 95 percent of the total R&D performance funds. The probabilities of being selected in the industry survey range from one change in 200 (.005) to certainty (1.000).

Universities and Colleges R&D Expenditures

Current expenditures for separately budgeted R&D include direct and indirect costs for research and development performed under a grant or contract from the Federal Government, State Government, industrial organizations, etc., and R&D paid for from institutions own funds which were designated or budgeted by the institution for such use.

Non-separately budgeted R&D Expenditures include amounts reported in addition to separately budgeted R&D expenditures representing departmental research and other R&D activities for which universities and colleges do not maintain separate records. These amounts are estimated by institutions and include funds allocated to departmental research by the various academic departments as well as so e indirect costs associated with R&D performance.

The coverage of the survey of universities and colleges survey includes some 800 institutions of higher education in the United States and U.S. possessions which are known to have R&D programs in the sciences and engineering. These institutions are sent mail questionnaires after which intensive follow-up procedures are employed with the larger universities resulting in obtaining R&D expenditures data comprising about 95 percent of all R&D expenditures at universities and colleges. Totals reported for this sector include estimates for nonresponse made from information compiled from secondary sources.

Nonprofit R&D Expenditures

Current R&D Expenditures include direct and indirect costs for R&D performed with funds provided by other organizations or from institutions' own funds.

The coverage of the survey of independent nonprofit research organizations includes some 500 to 600 facilities which are surveyed by mail. Follow-up for non-response is conducted by mail or, in the case of the largest intramural R&D performers, by telephone. The criteria for including a research institution in this sector is based primarily on its independent and tax exempt status with the U.S. Internal Revenue Service. There is no single directory or source document from which a complete mailing list of nonprofit organizations which perform research and development is available. Organizations are selected for surveying, therefore, from mailing lists used in previous surveys and a number of specialized directories. The number of such organizations with R&D expenditures totalling $100,000 or more excluded from the survey is believing to be extremely small.

Functional Distribution of Federal R&D Obligations

Scope and coverage. Data on Federal R&D obligations by function, (or R&D objective) presents a distribution of Federal funding by 16 individual functions representing the major purposes for which U.S. R&D efforts are committed. This distribution is made by National Science Foundation staff based on data compiled for the Budget of the United States Government and on agency reports to the National Science Foundation on R&D obligations.

The data on Federal outlays by function and subfunction are taken directly from the budget document. Interest is excluded as a function as is general revenue sharing the annual totals used for computation of shared relationships represents total outlays minus interest general revenue sharing and special allowances plus undistributed adjustments. No information is available to permit distribution of offsetting receipts among the various subfunctions.

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Classifications and definitions. The definitions of functions and subfunctions are implicit in their titles and content. Each function under the budget arrangement embraces the agency's components whose primary mission is related to that function. R&D programs of each agency's subdivision or program are classified into a single function since multiple functions would cause programs to overlap and add to more than 100 percent of total R&D expenditures.

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 1

U.S.: Transfers of funds expended annually for performance of research and development by sector, distributed by source, 1953–73

[Millions of dollars]

Year	Total R&D	Federal Government		Industry			Universities and colleges					Associated FFRDC's		Other nonprofit institutions			
		Total funds used	Source: Federal Government	Total funds used	Sources: Federal Government	Sources: Industry	Total funds used	Sources: Federal Government	Sources: Industry	Sources: Universities and colleges	Sources: Other nonprofit institutions	Total funds used	Source: Federal Government	Total funds used	Sources: Federal Government	Sources: Industry	Sources: Other nonprofit institutions
1953																	
1973																	

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 2

U.S.: Transfers of funds expended annually for performance of basic research by sector, distributed by source, 1953–73

[Millions of dollars]

Year	Total basic research	Federal Government		Industry			Universities and colleges					Associated FFRDC's		Other nonprofit institutions			
		Total funds used	Source: Federal Government	Total funds used	Sources: Federal Government	Sources: Industry	Total funds used	Sources: Federal Government	Sources: Industry	Sources: Universities and colleges	Sources: Other nonprofit institutions	Total funds used	Source: Federal Government	Total funds used	Sources: Federal Government	Sources: Industry	Sources: Other nonprofit institutions
1953																	
1973																	

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 3

U.S.: Transfers of funds expended annually for performance of applied research by sector, distributed by source, 1953–73

[Millions of dollars]

Year	Total applied research	Federal Government		Industry			Universities and colleges					Associated FFRDC's		Other nonprofit institutions			
		Total funds used	Source: Federal Government	Total funds used	Sources: Federal Government	Sources: Industry	Total funds used	Sources: Federal Government	Sources: Industry	Sources: Universities and colleges	Sources: Other nonprofit institutions	Total funds used	Source: Federal Government	Total funds used	Sources: Federal Government	Sources: Industry	Sources: Other nonprofit institutions
1953																	
1973																	

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 4

U.S.: Transfers of funds expended annually for performance of development by sector, distributed by source, 1953–73

[Millions of dollars]

Year	Total development	Federal Government		Industry			Universities and colleges					Associated FFRDC's		Other nonprofit institutio			
		Total funds used	Source: Federal Government	Total funds used	Sources: Federal Government	Sources: Industry	Total funds used	Sources: Federal Government	Sources: Industry	Sources: Universities and colleges	Sources: Other nonprofit institutions	Total funds used	Source: Federal Government	Total funds used	Sources: Federal Government	Sources: Industry	Sources: Oth nor pro insti tion
1953																	
1973																	

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 5

U.S.: Trends in defense, space, and all other R&D outlays, by source, 1953-73

Year	Defense-space outlays as a percent of total R&D			Nondefense-nonspace outlays as a percent of total R&D		
	Total	Defense related	Space related	Total	Non-Federal	Federal
1953						
.						
.						
.						
1973						

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 6

U.S. : Federal expenditures for research and development, by agency, fiscal years 1964-74
(Millions of dollars)

Agency	1964	Estimates 1973	Estimates 1974
Total, all agencies			
Departments			
Department of Agriculture			
Department of Commerce			
Department of Defense, Total			
Department of the Army			
Department of the Navy			
Department of the Air Force			
Departmentwide Funds			
Defense Agencies			
Director of Test and Evaluation			
Department of Health, Education, and Welfare			
Department of the Interior			
Department of Transportation			
Other Agencies			
Atomic Energy Commission			
Environmental Protection Agency			
Federal Aviation Agency			
National Aeronautics and Space Administration			
National Science Foundation			
Office of Economic Opportunity			
Veterans Administration			
All Other Agencies			

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 7
U.S. : Federal expenditures for R&D plant, by agency, fiscal years 1964-74
(Millions of dollars)

Agency	1964	Estimates 1973	Estimates 1974
Total, all agencies			
Departments			
Department of Agriculture			
Department of Commerce			
Department of Defense, Total			
Department of the Army			
Department of the Navy			
Department of the Air Force			
Defense Agencies			
Department of Health, Education, and Welfare			
Department of the Interior			
Department of Transportation			
Other Agencies			
Atomic Energy Commission			
Environmental Protection Agency			
Federal Aviation Agency			
National Aeronautics and Space Administration			
National Science Foundation			
Veterans Administration			
All Other Agencies			

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 8
U.S. : Federal obligations for research and development, by agency, fiscal years 1964-74
(Millions of dollars)

Agency	1964	Estimates 1973	Estimates 1974
Total, all agencies			
Departments			
Department of Agriculture			
Department of Commerce			
Department of Defense, Total			
Department of the Army			
Department of the Navy			
Department of the Air Force			
Departmentwide Funds			
Defense Agencies			
Director of Test and Evaluation			
Department of Health, Education, and Welfare			
Department of the Interior			
Department of Transportation			
Other Agencies			
Atomic Energy Commission			
Environmental Protection Agency			
Federal Aviation Agency			
National Aeronautics and Space Administration			
National Science Foundation			
Office of Economic Opportunity			
Veterans Administration			
All Other Agencies			

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 9

U.S. : Federal obligations for R&D plant, by agency, fiscal years 1964-74
(Millions of dollars)

Agency	1964	Estimates 1973	Estimates 1974
Total, all agencies			
Departments			
Department of Agriculture			
Department of Commerce			
Department of Defense, Total			
Department of the Army			
Department of the Navy			
Department of the Air Force			
Defense Agencies			
Department of Health, Education, and Welfare			
Department of the Interior			
Department of Transportation			
Other Agencies			
Atomic Energy Commission			
Environmental Protection Agency			
Federal Aviation Agency			
National Aeronautics and Space Administration			
National Science Foundation			
Veterans Administration			
All Other Agencies			

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 10

U.S. : Federal obligations for basic research, by selected agency, fiscal years 1964-74
(Millions of dollars)

Agency	1964	Estimates	
		1973	1974
Total			
Department of Agriculture			
Department of Defense			
Department of Health, Education, and Welfare			
Atomic Energy Commission			
National Aeronautics and Space Administration			
National Science Foundation			
All others			

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 11

U.S. : Federal obligations for applied research, by selected agency, fiscal years 1964-74
(Millions of dollars)

Agency	1964	Estimates	
		1973	1974
Total			
Department of Agriculture			
Department of Commerce			
Department of Defense			
Department of Health, Education, and Welfare			
Department of the Interior			
Department of Transportation			
Atomic Energy Commission			
Environmental Protection Agency			
National Aeronautics and Space Administration			
National Science Foundation			
Veterans Administration			
All others			

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 12

U.S. : Federal obligations for development, by selected agency, fiscal years 1964-74
(Millions of dollars)

Agency	1964	Estimates	
		1973	1974
Total			
Department of Defense			
Atomic Energy Commission			
National Aeronautics and Space Administration			
All others			

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 13

U.S. : Federal obligations for basic research, by performer, fiscal years 1964-74
(Millions of dollars)

Performer	1964	Estimates	
		1973	1974
Total			
Federal intramural			
Industrial firms			
Universities and colleges			
FFRDC's administered by universities			
Other nonprofit institutions			
All other performers			

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 14

U.S. : Federal obligations for applied research, by performer, fiscal years 1964-74
(Millions of dollars)

Performer	1964	Estimates	
		1973	1974
Total			
Federal intramural			
Industrial firms			
Universities and colleges			
FFRDC's administered by universities			
Other nonprofit institutions			
All other performers			

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 15

U.S. : Federal obligations for development, by performer, fiscal years 1964-74
(Millions of dollars)

Performer	1964	Estimates 1973	Estimates 1974
Total			
Federal intramural			
Industrial firms			
Universities and colleges			
FFRDC's administered by universities			
Other nonprofit institutions			
All other performers			

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 16
U.S. : Federal obligations for basic research, by field of science, fiscal years 1964-74
(Millions of dollars)

Field of Science	1964	Estimates 1973	Estimates 1974
Total, all fields			
Life sciences			
Psychology			
Physical sciences			
Environmental sciences			
Mathematics			
Engineering			
Social Sciences			
Other sciences			

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 17

U.S. : Federal obligations for applied research, by field of science, fiscal years 1964-74
(Millions of dollars)

Field of science	1964	Estimates	
		1973	1974
Total, all fields			
Life sciences			
Psychology			
Physical sciences			
Environmental sciences			
Mathematics			
Engineering			
Social sciences			
Other sciences			

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 18
U.S. : Federal obligations for research and development, by geographic division and State fiscal years 1963, 1965, 1968, 1969, 1970, 1971 and 1972

(Millions of dollars)

Division and State	1963	1972
United States, total.....		
New England.....		
Connecticut.....		
Maine.....		
Massachusetts.....		
New Hampshire.....		
Rhode Island.....		
Vermont.....		
Pacific.....		
Alaska.....		
California.....		
Hawaii.....		
Oregon.....		
Washington.....		
Outlying areas.....		
Offices abroad.....		

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 19
U.S. : Federal obligations for R&D plant, by geographic division and State, fiscal years 1963, 1965, 1968, 1969, 1970, 1971, and 1972

(Millions of dollars)

Division and State	1963	1972
United States, total		
New England		
Connecticut		
Maine		
Massachusetts		
New Hampshire		
Rhode Island		
Vermont		
Pacific		
Alaska		
California		
Hawaii		
Oregon		
Washington		
Outlying areas		
Offices abroad		

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 20

U.S.: Federal R&D expenditures by function, subfunction, and agency program under an alternative classification system, fiscal years 1963-74

[Dollars in millions]

Function, subfunction, and agency program	1963	-------	1974
Total, all functions.....			
Health, total.....			
Development of health resources, total.....			
National Institutes of Health.....			
Health Services and Mental Health Administration(HEW).....			
Medical and prosthetic research(VA).....			
Health-related activities(AEC).....			
⋮			
Commerce and industry, total.....			
Regional economic development, total.....			
Economic Development Administration(Commerce).....			
Appalachian Regional Commission.....			
Assistance to industry, total.....			
Office of Minority Business Enterprise(Commerce).....			
Small Business Administration.....			
Regulation of industry, total.....			
Federal Trade Commission.....			
Civil Aeronautics Board.....			

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 21

U.S.: Funds for research and development, by industry, 1956-1973

(Dollars in millions)

Industry and size of company	SIC code	1956 - - - 1973
Total	.....	
Distribution by industry		
Food and kindred products	20	
Textiles and apparel	22,23	
Lumber, wood products, and furniture	24,25	
Paper and allied products	26	
Chemicals and allied products	28	
Industrial chemicals	281-82	
Drugs and medicines	283	
Other chemicals	284-89	
Petroleum refining and extraction	29,13	
Rubber products	30	
Stone, clay, and glass products	32	
Primary metals	33	
Ferrous metals and products	331-32,3391,3399	
Nonferrous metals and products	333-36,3392	
Fabricated metal products	34	
Machinery	35	
Electrical equipment and communication	36,48	
Radio and TV receiving equipment	365	
Communication equipment and electronic components	366-67,48	
Other electrical equipment	361-64,369	
Motor vehicles and other transportation equipment	371,373-75,379	
Aircraft and missiles	372,19	
Professional and scientific instruments	38	
Scientific and mechanical measuring instruments	381-82	
Optical, surgical, photographic, and other instruments	383-87	
Other manufacturing industries	21,27,31,39	
Nonmanufacturing industries	07-12,14-17,41-47, 49-67,739,807,891	

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 22

U.S.: Federal funds for research and development, by industry 1957-1973

(Dollars in millions)

Industry	SIC code	1957 - - - 1973
Total	.....	
Distribution by industry		
Food and kindred products	20	
Textiles and apparel	22,23	
Lumber, wood products, and furniture	24,25	
Paper and allied products	26	
Chemicals and allied products	28	
Industrial chemicals	281-82	
Drugs and medicines	283	
Other chemicals	284-89	
Petroleum refining and extraction	29,13	
Rubber products	30	
Stone, clay, and glass products	32	
Primary metals	33	
Ferrous metals and products	331-32,3391,3399	
Nonferrous metals and products	333-36,3392	
Fabricated metal products	34	
Machinery	35	
Electrical equipment and communication	36,48	
Radio and TV receiving equipment	365	
Communication equipment and electronic components	366-67,48	
Other electrical equipment	361-64,369	
Motor vehicles and other transportation equipment	371,373-75,379	
Aircraft and missiles	372,19	
Professional and scientific instruments	38	
Scientific and mechanical measuring instruments	381-82	
Optical, surgical, photographic, and other instruments	383-87	
Other manufacturing industries	21,27,31,39	
Nonmanufacturing industries	07-12,14-17,41-47, 49-67,739,807,891	

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 23

U.S.: Company funds for research and development, by industry 1957-1973

(Dollars in millions)

Industry	SIC code	1957 - - - 1973
Total	.....	
Distribution by industry		
Food and kindred products	20	
Textiles and apparel	22,23	
Lumber, wood products, and furniture	24,25	
Paper and allied products	26	
Chemicals and allied products	28	
Industrial chemicals	281-82	
Drugs and medicines	283	
Other chemicals	284-89	
Petroleum refining and extraction	29,13	
Rubber products	30	
Stone, clay, and glass products	32	
Primary metals	33	
Ferrous metals and products	331-32,3391,3399	
Nonferrous metals and products	333-36,3392	
Fabricated metal products	34	
Machinery	35	
Electrical equipment and communication	36,48	
Radio and TV receiving equipment	365	
Communication equipment and electronic components	366-67,48	
Other electrical equipment	361-64,369	
Motor vehicles and other transportation equipment	371,373-75,379	
Aircraft and missiles	372,19	
Professional and scientific instruments	38	
Scientific and mechanical measuring instruments	381-82	
Optical, surgical, photographic, and other instruments	383-87	
Other manufacturing industries	21,27,31,39	
Nonmanufacturing industries	07-12,14-17,41-47, 49-67,739,807,891	

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Table 24
U. S.: Funds for research and development, by industry and size of company, 1956-1973a/

Industry	SIC code	Millions of dollars				
		Total	Companies with total employment of--			
			Less than 1,000	1,000 to 4,999	5,000 to 9,999	10,000 or more
Total	. . . . .					
Food and kindred products	20					
Textiles and apparel	22,23					
Lumber, wood products, and furniture	24,25					
Paper and allied products	26					
Chemicals and allied products	28					
Industrial chemicals	281-82					
Drugs and medicines	283					
Other chemicals	284-89					
Petroleum refining and extraction	29,13					
Rubber products	30					
Stone, clay, and glass products	32					
Primary metals	33					
Ferrous metals and products	331-32,3391,3399					
Nonferrous metals and products	333-36,3392					
Fabricated metal products	34					
Machinery	35					
Electrical equipment and communication	36,48					
Radio and TV receiving equipment	365					
Communication equipment and electronic components	366-67,48					
Other electrical equipment	361-64,369					
Motor vehicles and other transportation equipment	371,373-75,379					
Aircraft and missiles	372,19					
Professional and scientific instruments	38					
Scientific and mechanical measuring instruments	381-82					
Optical, surgical, photographic, and other instruments	383-87					
Other manufacturing industries	21,27,31,39					
Nonmanufacturing industries	07-12,14-17,41-47 49-67,739,807,891					

a/ These data are available for each year, 1956 through 1973.

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Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1

Table 25

U. S.: Funds for basic research, applied research, and development by selected industry and size of company, 1957-1973[a/]

[Dollars in millions]

Industry and size of company	SIC code	Total	Basic research	Applied research	Development
Total	. . . . .				
Distribution by industry					
Food and kindred products	20				
Textile and apparel	22,23				
Paper and allied products	26				
Chemicals and allied products	28				
Industrial chemicals	281-82				
Drugs and medicines	283				
Other chemicals	284-89				
Petroleum refining and extraction	29,13				
Rubber products	30				
Primary metals	33				
Fabricated metal products	34				
Machinery	35				
Electrical equipment and communication	36,38				
Communication equipment and electronic components	366-67,48				
Aircraft and missiles	372,19				
Nonmanufacturing industries	07-12,14-17,41-47, 49-67,739,807,891				
Distribution by size of company (based on number of employees)					
Less than 1,000	. . . . .				
1,000 to 4,999	. . . . .				
5,000 to 9,999	. . . . .				
10,000 or more	. . . . .				

a/ These data are available for each year, 1957 through 1973.

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Table 26
U. S.: Funds for basic research, by selected industry and field of science, 1957-1973[a]

[Dollars in millions]

Industry	SIC code	Total	Physical sciences	Mathematics	Environmental sciences	Engineering (including metallurgy)	Life sciences	Other sciences
Total								
Food and kindred products	20							
Textiles and apparel	22,23							
Paper and allied products	26							
Chemicals and allied products	28							
Industrial chemicals	281-82							
Drugs and medicines	283							
Other chemicals	284-89							
Petroleum refining and extraction	29,13							
Rubber products	30							
Primary metals	33							
Ferrous metals and products	331-32,3391,3399							
Nonferrous metals and products	333-36,3392							
Fabricated metal products	34							
Machinery	35							
Electrical equipment and communication	36,48							
Communication equipment and electronic components	366-67,48							
Other electrical equipment	361-64,369							
Aircraft and missiles	372,19							
Nonmanufacturing industries	07-12,14-17,41-47, 49-67,739,807,891							

a/ These data are available for each year, 1957 through 1973.

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Table 27

U.S.: Funds for applied research and development, by product field, 1959-1973

(Dollars in millions)

Product field	SIC code	1959 - - - 1973
Total	.....	
Atomic energy devices	.....	
Ordnance, except guided missiles	19,except192	
Guided missiles and spacecraft	192	
Food and kindred products	20	
Textile mill products	22	
Chemicals, except drugs and medicines	28,except283	
Industrial inorganic and organic chemicals	281	
Plastics materials and synthetic resins, rubber, and fibers	282	
Agricultural chemicals	287	
Other chemicals	284-89	
Drugs and medicines	283	
Petroleum refining and extraction	29,13	
Rubber and miscellaneous plastics products	30	
Stone, clay, and glass products	32	
Primary metals	33	
Ferrous metals and products	331-32,3391,3399	
Nonferrous metals and products	333-36,3392	
Fabricated metal products	34	
Machinery	35	
Engines and turbines	351	
Farm machinery and equipment	352	
Construction, mining, and materials handling machinery	353	
Metalworking machinery and equipment	354	
Office, computing, and accounting machines	357	
Other machinery, except electrical	balance of 35	
Electrical equipment, except communication	36,except365-67	
Electric transmission and distribution equipment	361	
Electrical industrial apparatus	362	
Other electrical equipment and supplies	363-64,369	
Communication equipment and electronic components	365-67	
Motor vehicles and other transportation equipment	37,except372	
Motor vehicles and equipment	371	
Other transportation equipment	373-75,379	
Aircraft and parts	372,19	
Professional and scientific instruments	38	
Other product fields, not elsewhere classified	.....	

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Table 28
U.S.: Distribution of R&D costs, by industry and type of cost, 1962-1973 a/

Industry	SIC code	Millions of dollars					
		Coverage ratio	R&D costs	Wages		Materials and supplies	Other R&D costs
				Scientists and engineers	Supporting personnel		
Total	.....						
Food and kindred products	20						
Textiles and apparel	22,23						
Lumber, wood products, and furniture	24,25						
Paper and allied products	26						
Chemicals and allied products	28						
Industrial chemicals	281-82						
Drugs and medicines	283						
Other chemicals	284-89						
Petroleum refining and extraction	29,13						
Rubber products	30						
Stone, clay, and glass products	32						
Primary metals	33						
Ferrous metals and products	331-32,3391,3399						
Nonferrous metals and products	333-36,3392						
Fabricated metal products	34						
Machinery	35						
Electrical equipment and communication	36,48						
Radio and TV receiving equipment	365						
Communication equipment and electronic components	366-67,48						
Other electrical equipment	361-64,369						
Motor vehicles and other transportation equipment	371,373-75,379						
Aircraft and missiles	372,19						
Professional and scientific instruments	38						
Scientific and mechanical measuring instruments	381-82						
Optical, surgical, photographic, and other instruments	383-87						
Other manufacturing industries	21,27,31,39						
Nonmanufacturing industries	07-12,14-17,41-47 49-67,739,807,891						

a/ These data are available for each year, 1962 through 1973.

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Table 29
U.S.: Geographic distribution of funds for industrial research and development, 1962-1973

Area	1962 - - - 1973
UNITED STATES, TOTAL	
NORTHEAST	
New England	
Maine	
New Hampshire	
Vermont	
Massachusetts	
Rhode Island	
Connecticut	
Pacific	
Washington	
Oregon	
California	
Alaska	
Hawaii	

Approved For Release 2000/08/23 : CIA-RDP79-00798A000500090003-1
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Table 30

U. S.: Current expenditures for research and development in universities and colleges, by source of funds, 1953-1973

[Dollars in millions]

Year	Total R&D performance	Source of funds				Universities' and colleges' own funds
		Federal Government	State and local governments	Industry	Other nonprofit institutions	
1953						
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1973						

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Table 31

U. S.: Current expenditures for research and development in universities and colleges, by State, 1964-1973

State	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
United States, total										
New England										
Maine										
New Hampshire										
Vermont										
Pacific										
Washington										
Oregon										
California										
Alaska										
Hawaii										

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Table 32

U. S.: Federal expenditures for research and development in universities and colleges, by State, 1964-1973

State	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
United States, total										
New England										
Maine										
New Hampshire										
Vermont										
Pacific										
Washington										
Oregon										
California										
Alaska										
Hawaii										

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Table 33

U. S.: Current expenditures for R&D in universities and colleges, by field of science, and source of funds, 1964-1973

[Dollars in thousands]

Field of science and source of funds	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Total										
Federal Government										
Other sources										
Engineering										
Federal Government										
Other sources										
Physical sciences										
Federal Government										
Other sources										
Environmental sciences										
Federal Government										
Other sources										
Mathematics										
Federal Government										
Other sources										
Life sciences										
Federal Government										
Other sources										
Psychology										
Federal Government										
Other sources										
Social sciences										
Federal Government										
Other sources										
Other sciences, n.e.c.										
Federal Government										
Other sources										

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Table 34

U. S.: Percent distribution of selected financial, employment, and educational characteristics of scientific and engineeri activities of universities and colleges, by institutional group ranked on the basis of R&D expenditures, 1968-1973[a]

[Dollars in thousands]

Institutional group ranked according to amount of R&D expenditures	Current R&D expenditures			Total expenditures for instruction	Capital expenditures for research, development, and instruction			Scientists and engineers	Degrees grant in the scienc and engineeri	
	Total	Federal Government	Other sources		Total	Federal Government	Other sources		Total	P.D.
Total, all institutions										
First 10										
Second 10										
Third 10										
Fourth 10										
Fifth 10										
Sixth 10										
Seventh 10										
Eighth 10										
Ninth 10										
Tenth 10										
First 100										
All other institutions										

a/ These data are available for each year, 1968 through 1973.

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Table 35

U. S.: Capital expenditures for research, development, and instruction in the sciences and engineering in universities and colleges, by type of institution, and source of funds, 1964-1973[a/]

[Dollars in thousands]

Type of institution	Total capital expenditures		
	Total	Federal Government	Other sources
Total			
Doctorate			
Master's			
Bachelor's			
No science degree			

a/ These data available for each year, 1964 through 1973.

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Table 36

U. S.: Current expenditures for intramural R&D performance of independent nonprofit institutions, by source of funds, 1953-1973

[Dollars in millions]

	Total	Federal Government	Industry	Other sources
1953				
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1973				

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Table 37

U. S.: Current expenditures for R&D performance of independent nonprofit institutions, by source of funds and R&D expenditure-size class, 1964-1973

[Dollars in thousands]

Source of funds	Total	R&D expenditure-size class			
		Less than $500	$500 to $999	$1,000 to $4,999	$5,000 or more
Total					
Federal Government					
State governments					
Local governments					
Foundations					
Voluntary health agencies					
Industry					
Institutions' own funds					
Other sources					

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Table 38

U. S.: Current expenditures for R&D performance of independent nonprofit institutions, by field of science

[Dollars in thousands]

Field of science	1964	1966	1969	1973
Total				
Engineering				
Physical and environmental sciences				
Mathematics				
Life sciences				
Psychology				
Social sciences				
Other sciences, n.e.c.				

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(617) 253-1661

April 9, 1974

Dr. E. E. Grishayev
Head, Department of Finance and Capital Investment
State Committee of the Council of Ministers
Moscow, U.S.S.R.

Dear Dr. Grishayev:

The United States members of the working subgroup on financial research and development statistics have been deeply involved over the past several weeks in identifying data on Soviet research and development expenditures which United States analysts feel will be needed for comparative studies on United States and U.S.S.R. levels of effort in research and development. Similarly, financial data on United States research and development for use by Soviet analysts have been selected for your consideration and relevant information on United States definitions concepts and survey methodologies is being prepared.

Science Policy

OER
OSI
Ellie forOSR
Emil
Ruth

I expect the work on this phase of the study program to be completed in the very near future so that the material can be sent to you by the end of April. I am looking forward to receiving comparable material prepared by you and your associates.

I am sorry you were unable to attend the November meeting held in Washington, D.C. It was a pleasure, however, meeting and working with Dr. Maslennikov. Please give him my warmest regards.

Sincerely,

J. Herbert Hollomon
Director
Center for Policy Alternatives

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April 9, 1974

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State Committee of the Council of Ministers
Moscow, U.S.S.R.

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Sincerely,

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